热力系统㶲分析及计算

摘　　要

随着科技进步，人类对能源的需求愈加剧烈，在这样能源资源都相对匮乏的时代，高效率的能量转换会让我们的生活科技更加进步。能源在燃烧后生成能量，能量在不同形式之间转换，在该过程中，每种形式的能量都需要相应设备进行转换成另一种形式的能，这些设备组合在一起就构成了热力系统。热力系统能量转换效率是衡量系统完善程度的指标，计算该效率的方法有两种，一种是基于能量守恒定律的热效率分析法；另一种是基于热力学第二定律的㶲分析法，该方法同时兼顾能量的“数量”和“质量”，能更好的评价热力系统的完善程度。本论文将火电厂热力系统作为分析目标，采取㶲分析的方法，计算热力系统的可用能转化率及可用能的损失。为体现㶲分析法更适合于评价热力系统完善程度，需要将热分析法计算热力系统作为对比，继而得出结论。

㶲的种类很多，在某一特定热力系统中也包含多种形式的㶲，在互相转换的过程中，由于部分反应不可逆，所以会出现㶲损失，进而影响㶲效率。在利用㶲分析法计算系统能量转换效率之前需要先计算热平衡，热平衡参数包括燃料燃烧的总热量、烟气带走的热损失、水蒸气吸收的热量，随后计算收支差，收支差与燃料燃烧产生热量的比就是锅炉的热效率。随后再计算㶲平衡，㶲平衡的参数包括㶲损失、燃料供给㶲、给水㶲、蒸汽㶲、温度㶲。一些难以衡量的㶲损失不包括在计算所用的㶲损失内，如排㶲和扩散㶲。根据煤的理论燃烧温度，计算燃烧产物带来温度㶲。燃烧是不可逆的化学反应，这部分能量转化为系统的内部㶲；进而计算得出㶲的收支差，得出系统㶲效率。根据实验结果进行对比得出结论，㶲分析法对于评价热力系统的完善程度，经济性更加合理准确，为后续寻找热力系统节能的途径提供了理论依据。

热力系统和换热器对于可用能利用率的高低之分主要取决于自身循环系统的优劣。循环系统越完善，带来的㶲损失就越少，可用能转换效率就越高，能源利用率就越高。所以，对于热力系统和换热器分析的主要目的就是分析各个设备的主要㶲损失，对此进行针对性完善，以减少㶲损失。

关键词：热力系统；㶲分析；㶲损失；换热器

Abstract

With the progress of science and technology, the demand for energy is becoming more and more intense. In such an era when energy resources are relatively scarce, efficient energy conversion will make our life more technological progress. Each form of energy requires a corresponding device to convert it into another form of energy. Together, these devices make up the thermodynamic system. There are two methods to calculate the energy conversion efficiency of a thermodynamic system, one is based on the law of conservation of energy, the other is based on the second law of thermodynamics. Taking the thermal system of thermal power plant as the object of analysis, this paper calculates the conversion rate of available energy and the loss of available energy by using the method of analysis. In order to evaluate the perfect degree of thermal system, the thermal analysis method should be used to calculate the thermal system as a comparison, and then draw conclusions.

There are many kinds of martingale. In a certain thermodynamic system, there are many kinds of martingale. In the process of conversion, some reactions are irreversible, so the martingale loss occurs, which affects the efficiency. It is necessary to calculate the heat balance before calculating the energy conversion efficiency of the system by using the Fourier analysis method. The heat balance parameters include the total heat of fuel combustion, the heat loss caused by the Fourier gas, the heat absorbed by the water vapor, and then calculate the balance of income and expenditure. Then we calculate the epee equilibrium. The epee equilibrium parameters include epee loss, fuel supply, water supply, steam and temperature. Some of the hard-to-measure losses are not included in the losses used in the calculation, such as emissions and diffusion. According to the theoretical combustion temperature of coal, the temperature brought by combustion products is calculated. Combustion is an irreversible chemical reaction, and this energy is